New Abstract

Self-validating (SEVA) sensors implemented in a control process provide various metrics regarding sensed variables to a central control unit. Specifically, SEVA sensors provide measurements of the variables and validity information about the measurements, which may include fault information about the sensors themselves. A control unit utilizes the various SEVA metrics even when large numbers of SEVA sensors are used, a situation that is otherwise problematic due to difficulties in assimilating data from multiple SEVA sensors. Accordingly, the control unit distinguishes sensor faults from actual process changes, and responds as needed, even when large numbers of SEVA sensors are implemented together. Specifically, the monitoring and control unit assimilates signals from multiple SEVA sensors using a multi-variate statistical analysis, and compares results of this analysis with a model based on theoretical characterizations of behavior of the sensors, where the model may be based on actuator position information, and/or historical statistical data.